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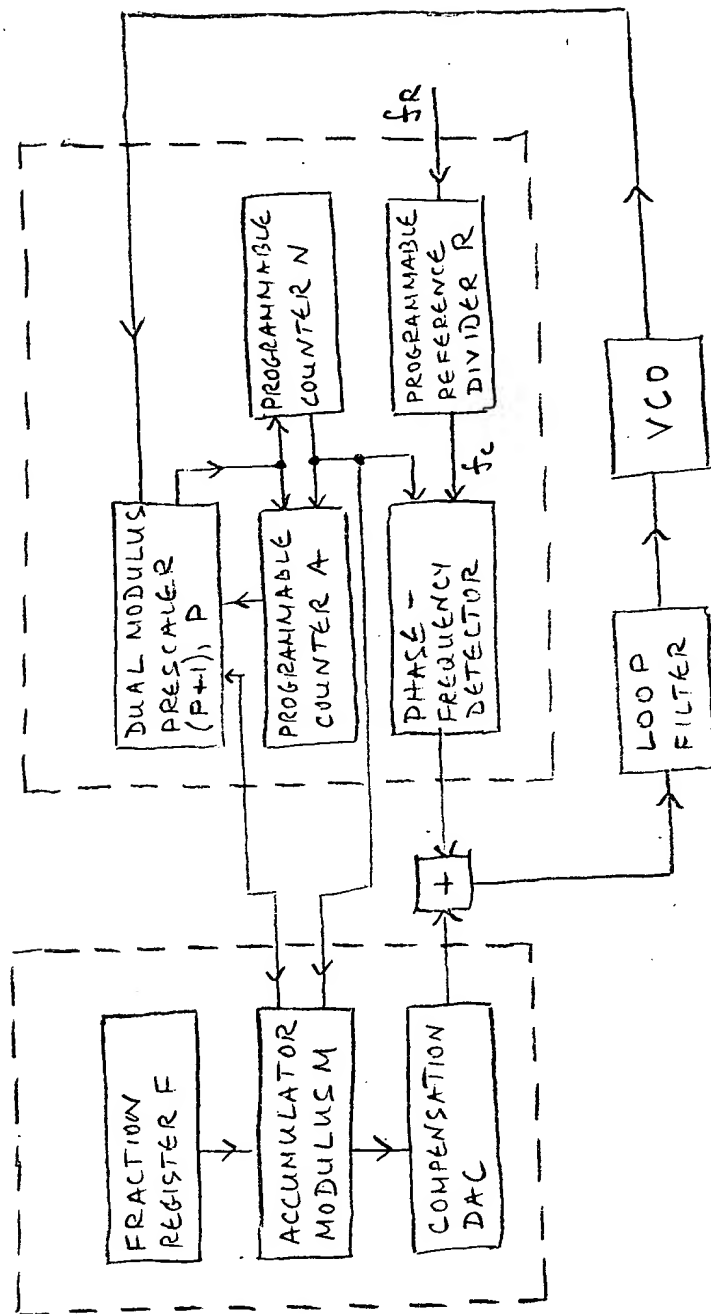


FIG. 1 (PRIOR ART)

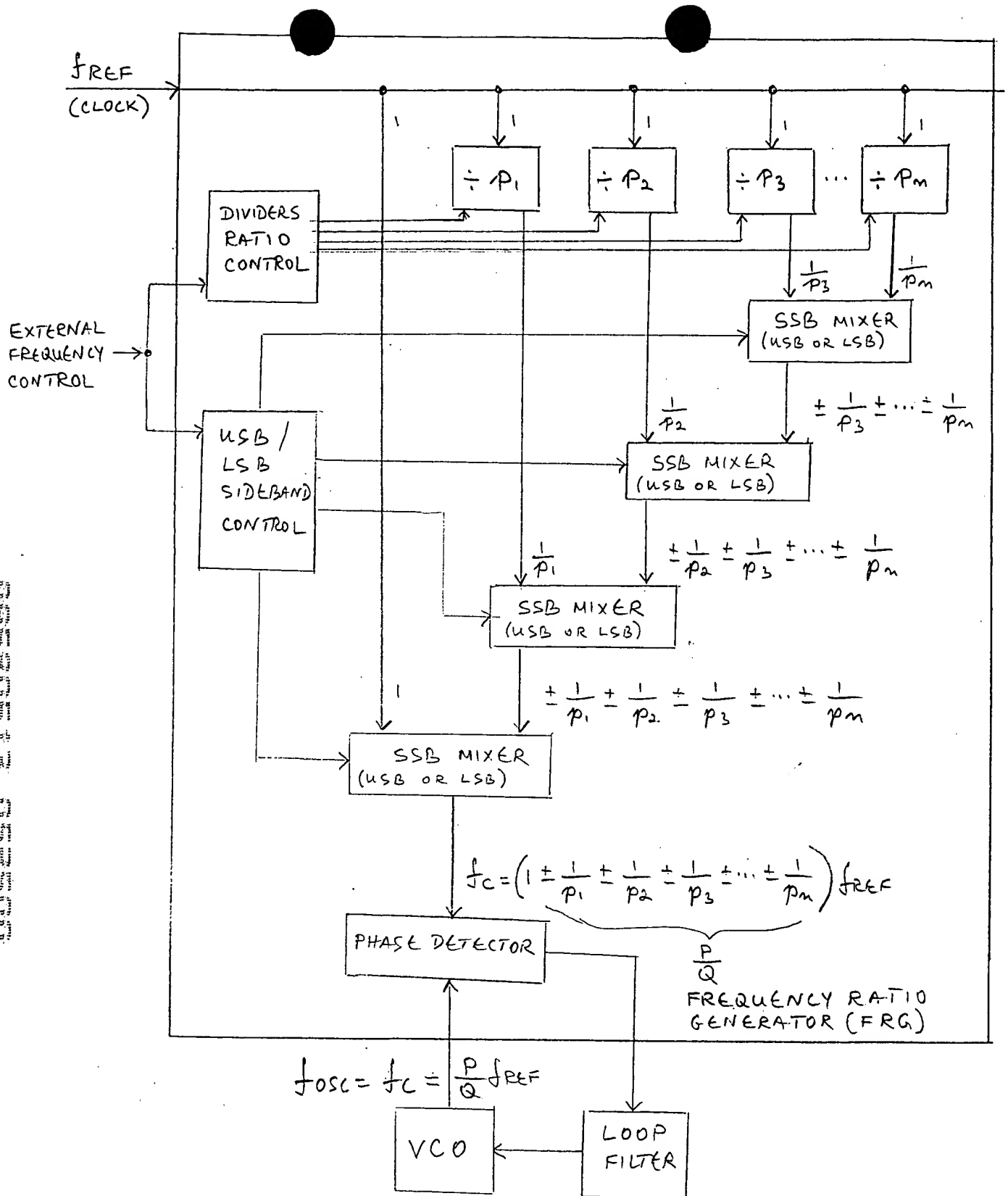


FIG. 2

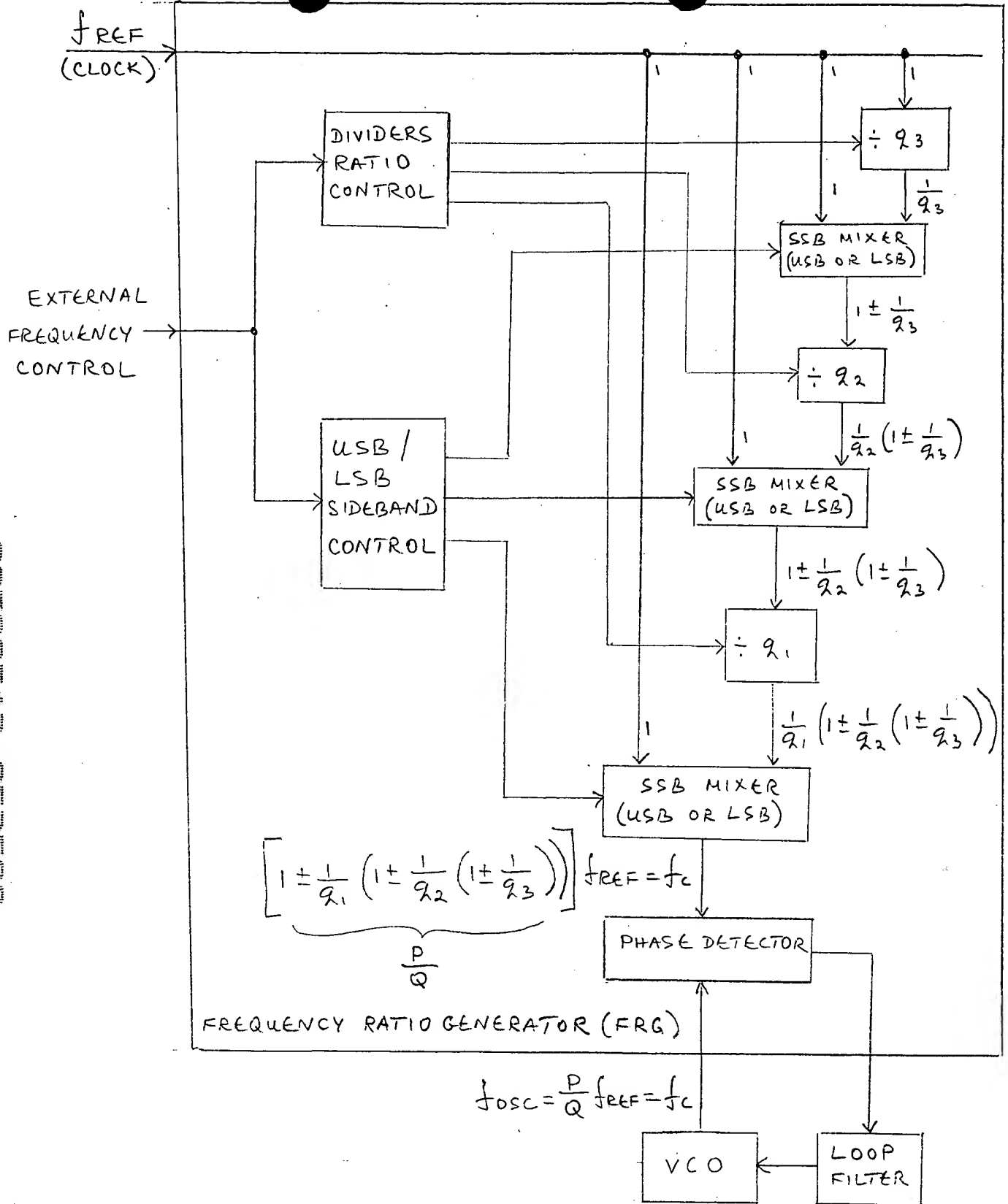


FIG. 3

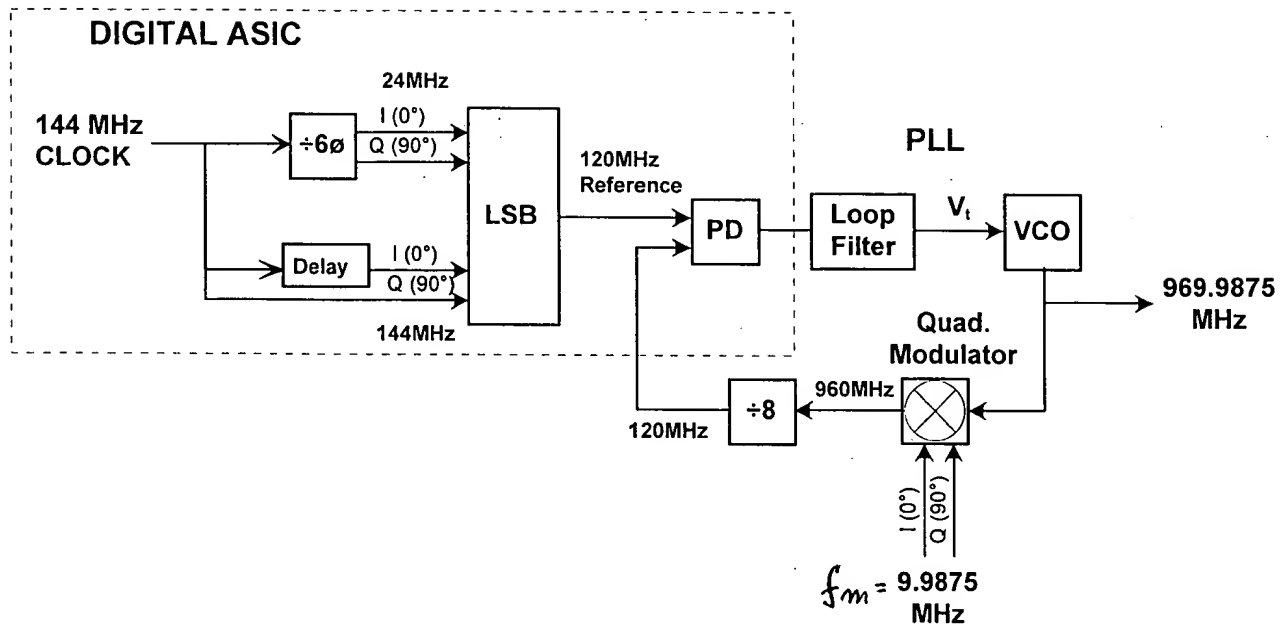


Figure 4a: LO1 generation

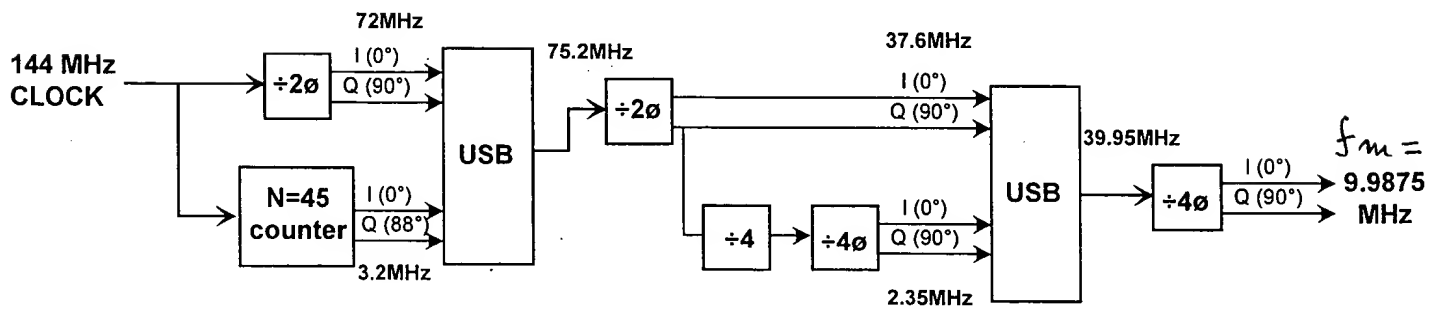


Figure 4b: 9.9875 MHz Offset for LO1 generation

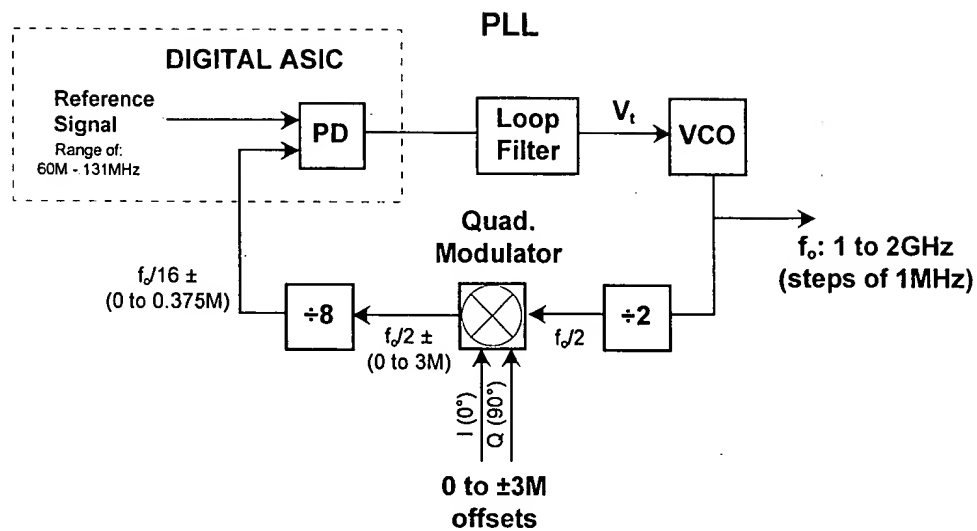


Figure 5a: LO2 generation

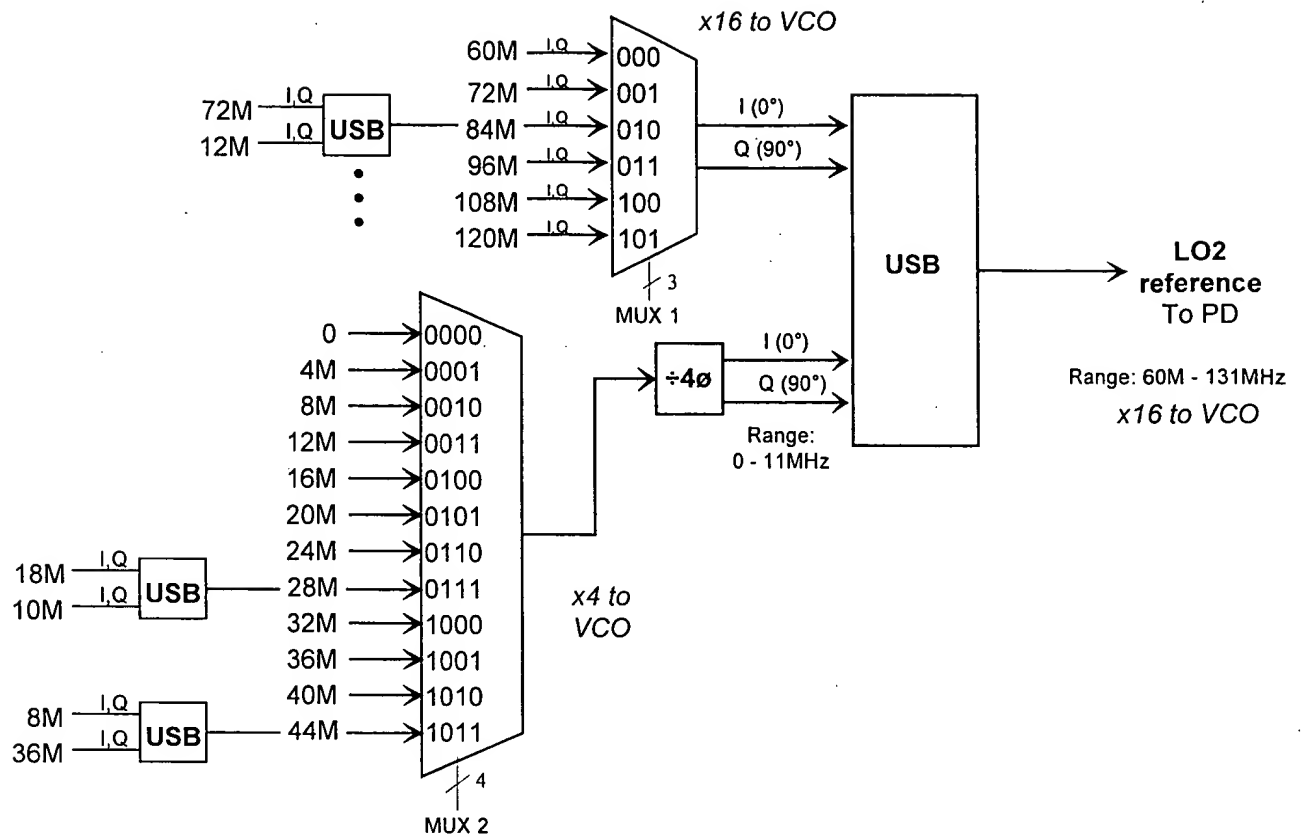


Fig. 5b - Generation of Reference frequency for LO2

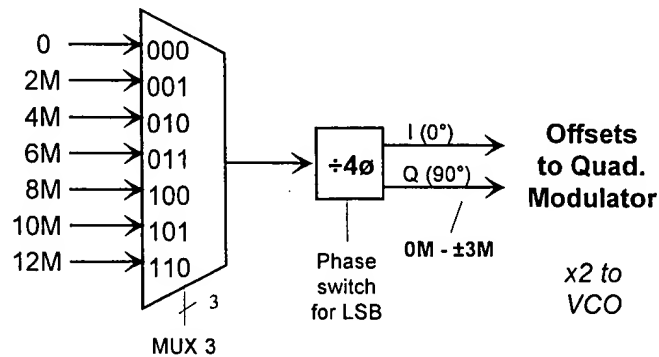


Fig. 5c - Generation of offsets for LO2

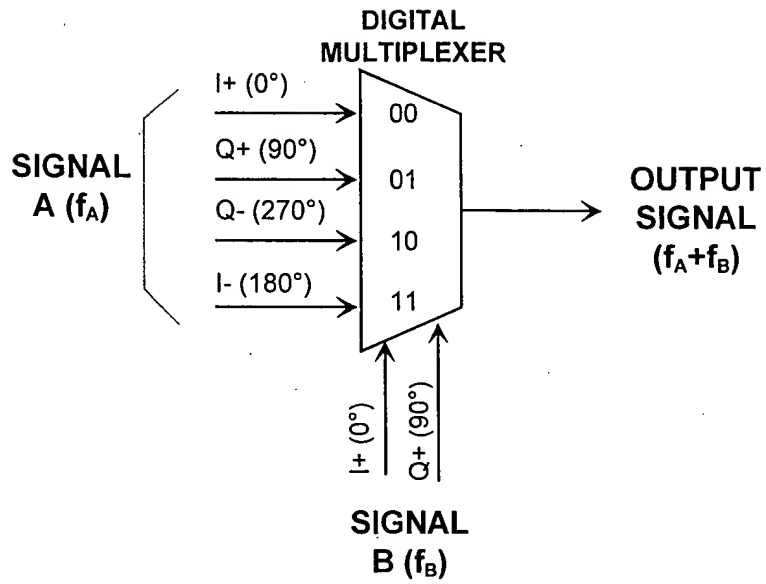


Figure 6a: USB generation block

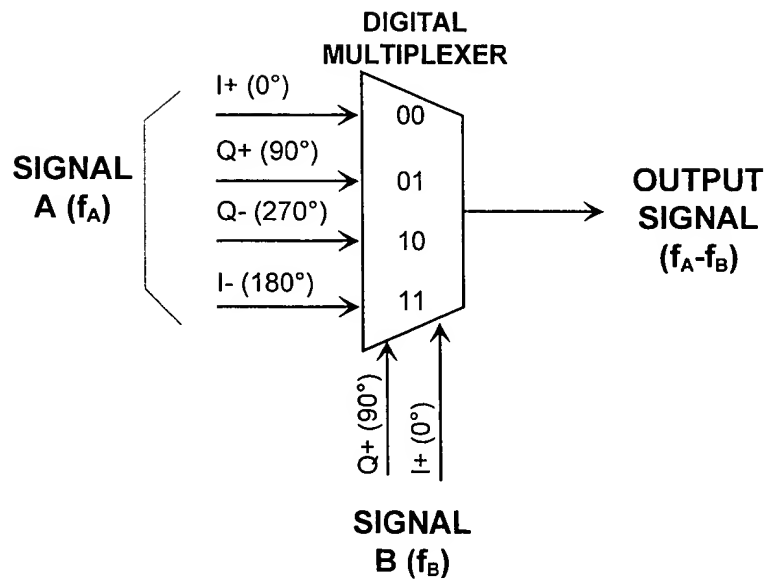


Figure 6b: LSB generation block
(notice that in Signal B, the two inputs are swapped)

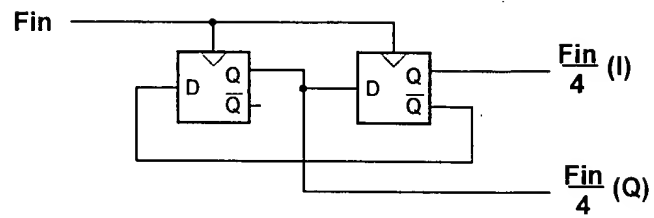


Figure 7: Divide by 4 (quadrature outputs) - Prior art

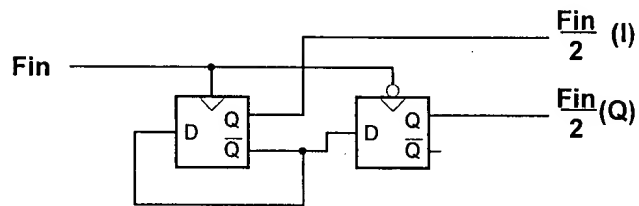


Figure 8: Divide by 2 (quadrature outputs)

W8.11-1

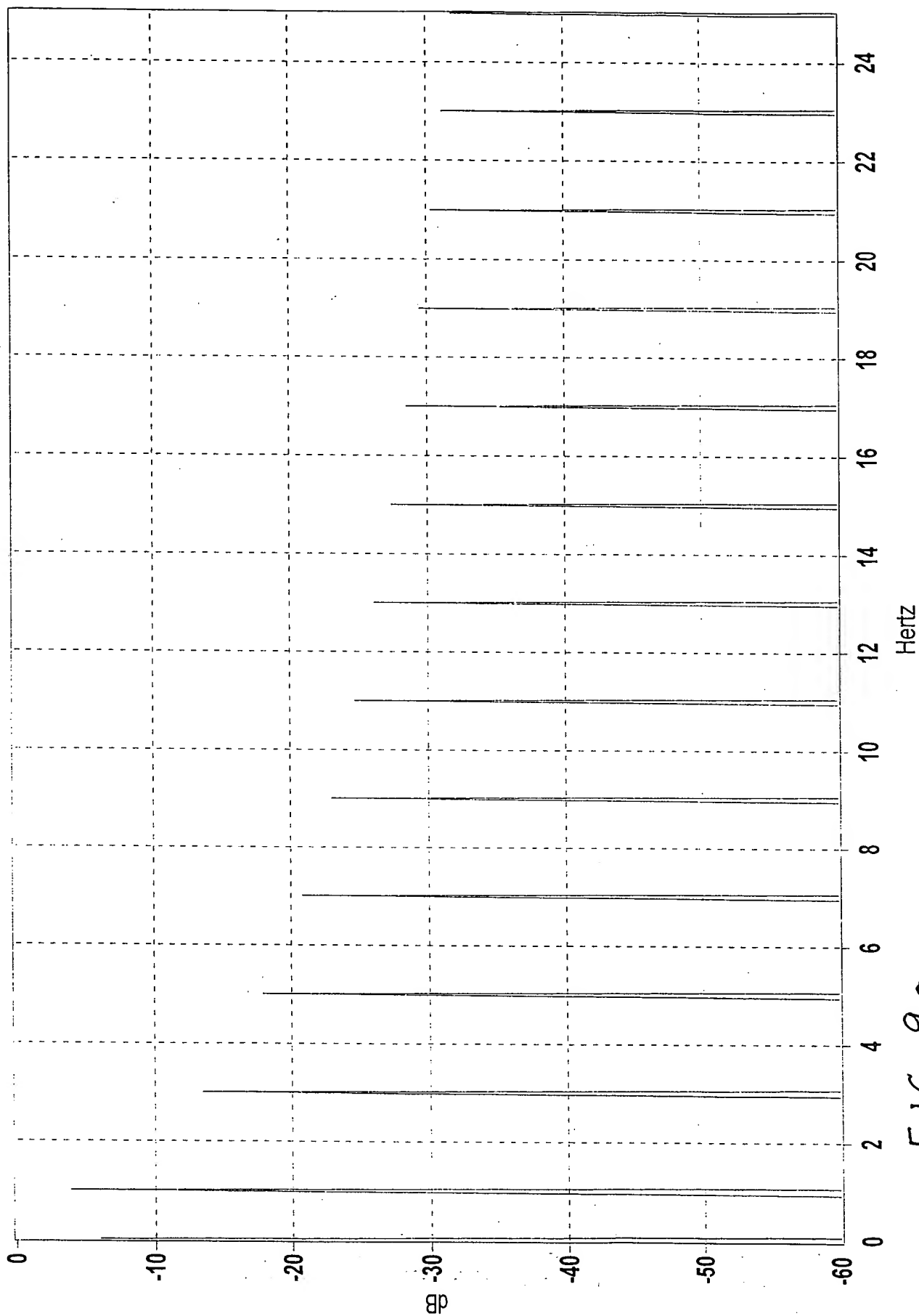


FIG. 9a

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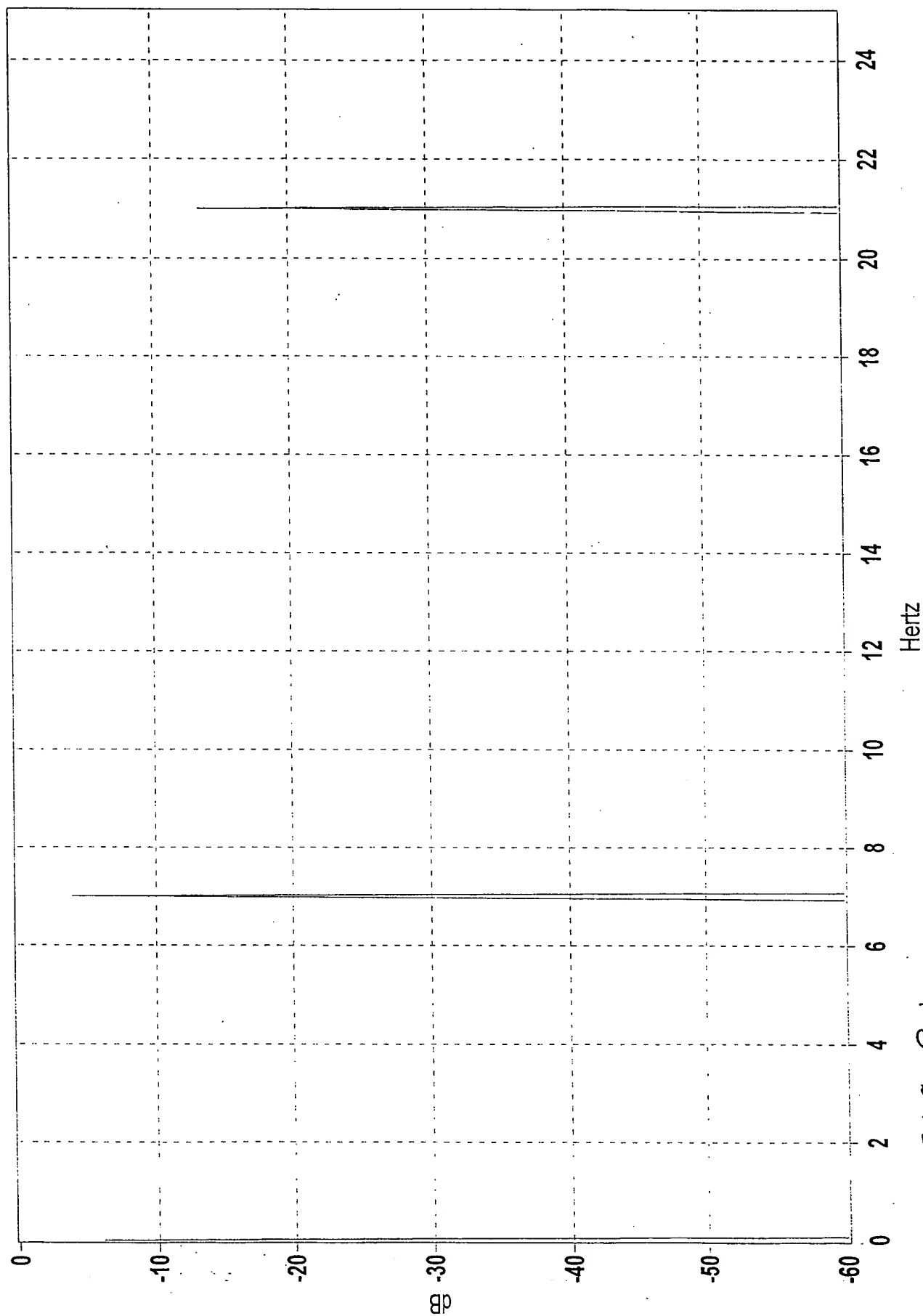


FIG. 9b

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BUREAU OF STANDARDS
NATIONAL BUREAU OF STANDARDS
WASHINGTON, D. C. 20540
NBS-10-USB

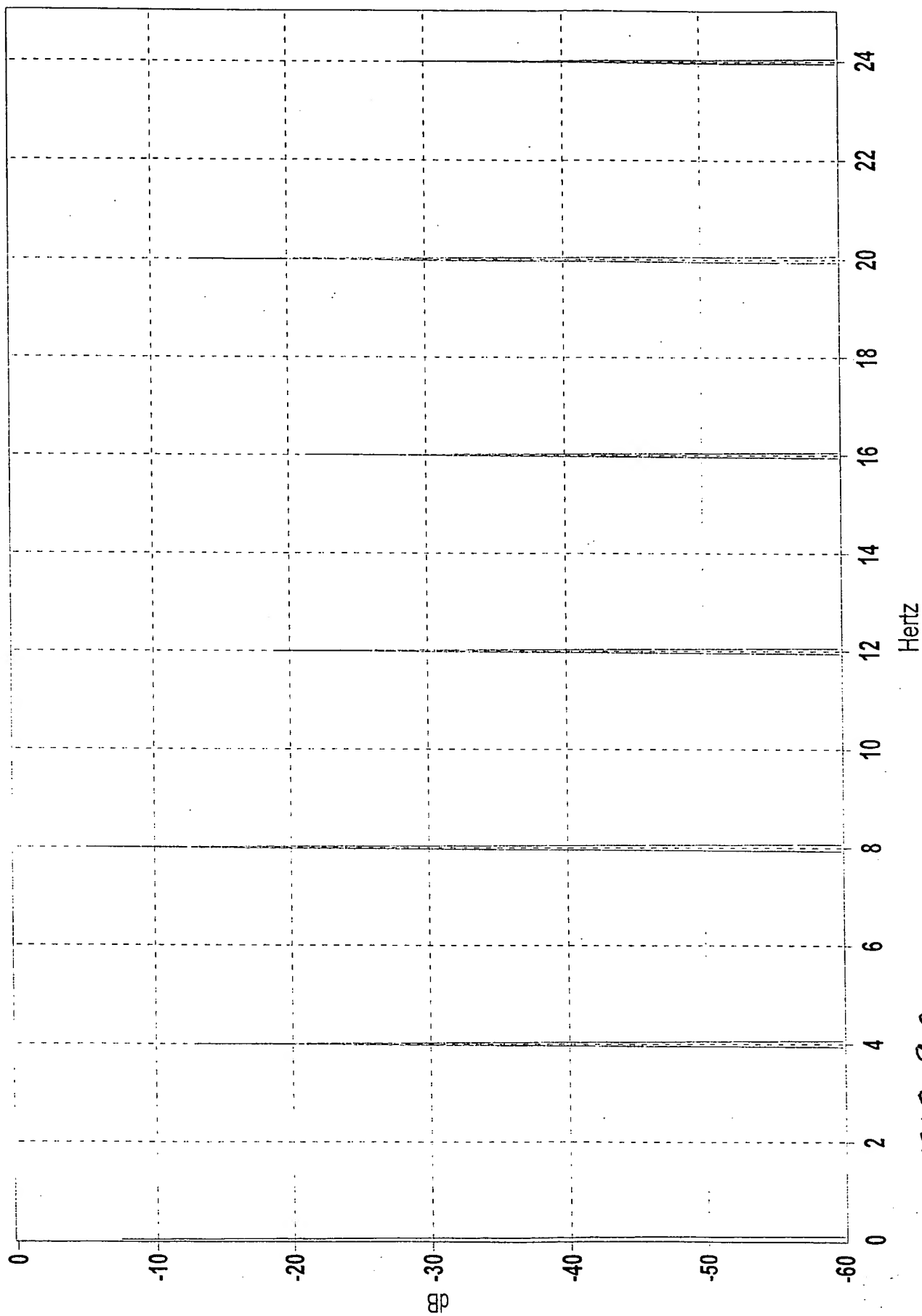
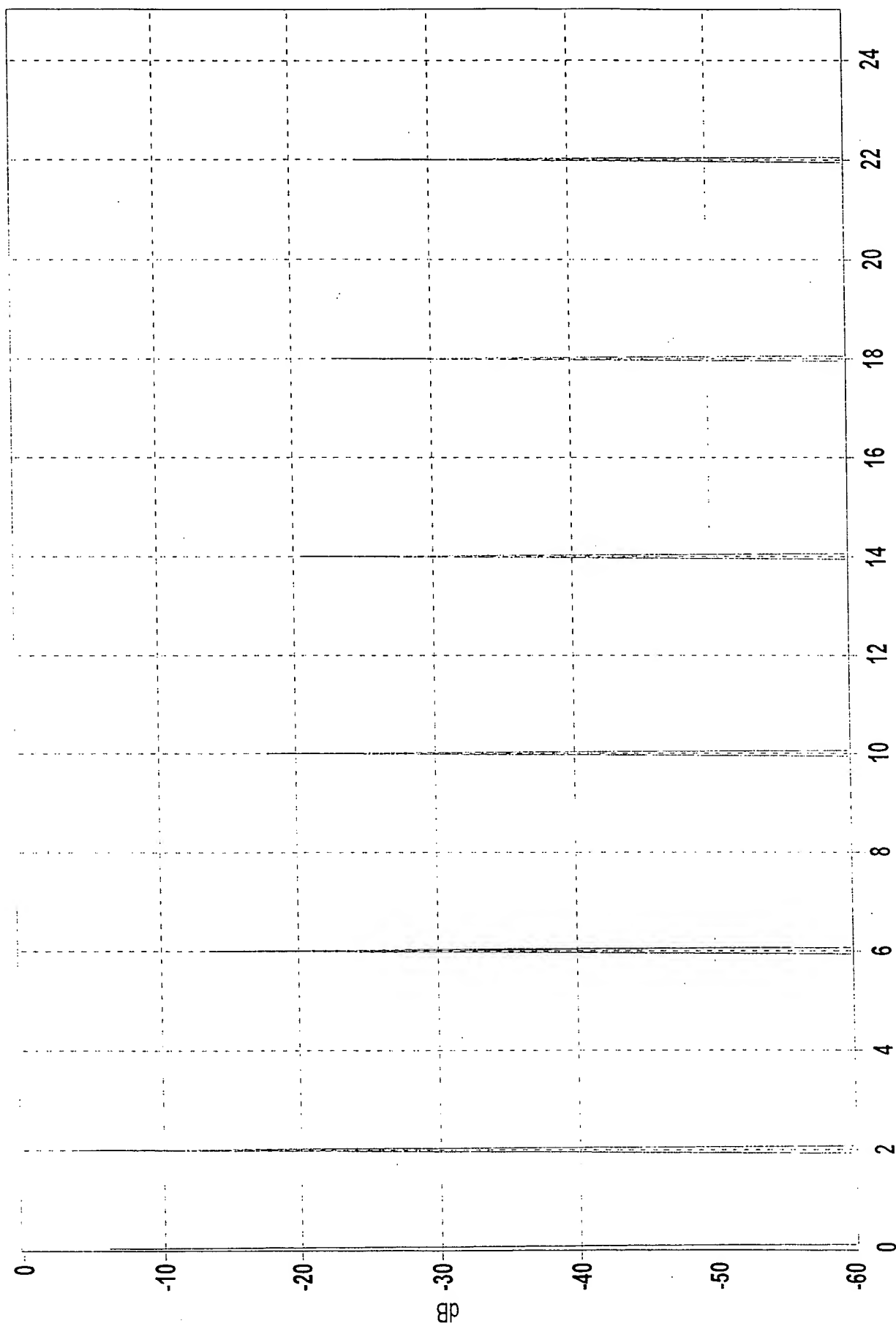


FIG. 9C

W13.USB#



16.10a

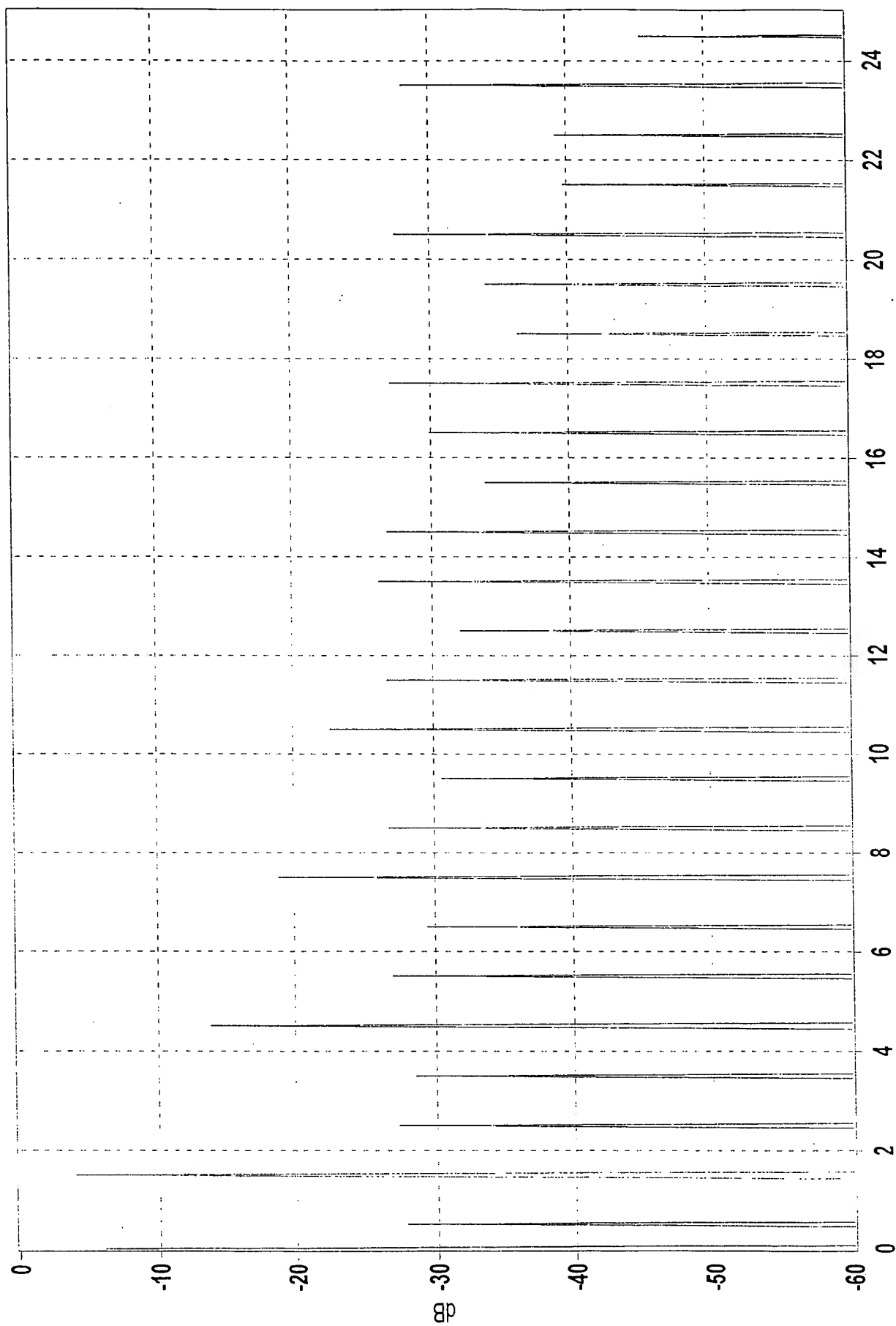


FIG. 10b

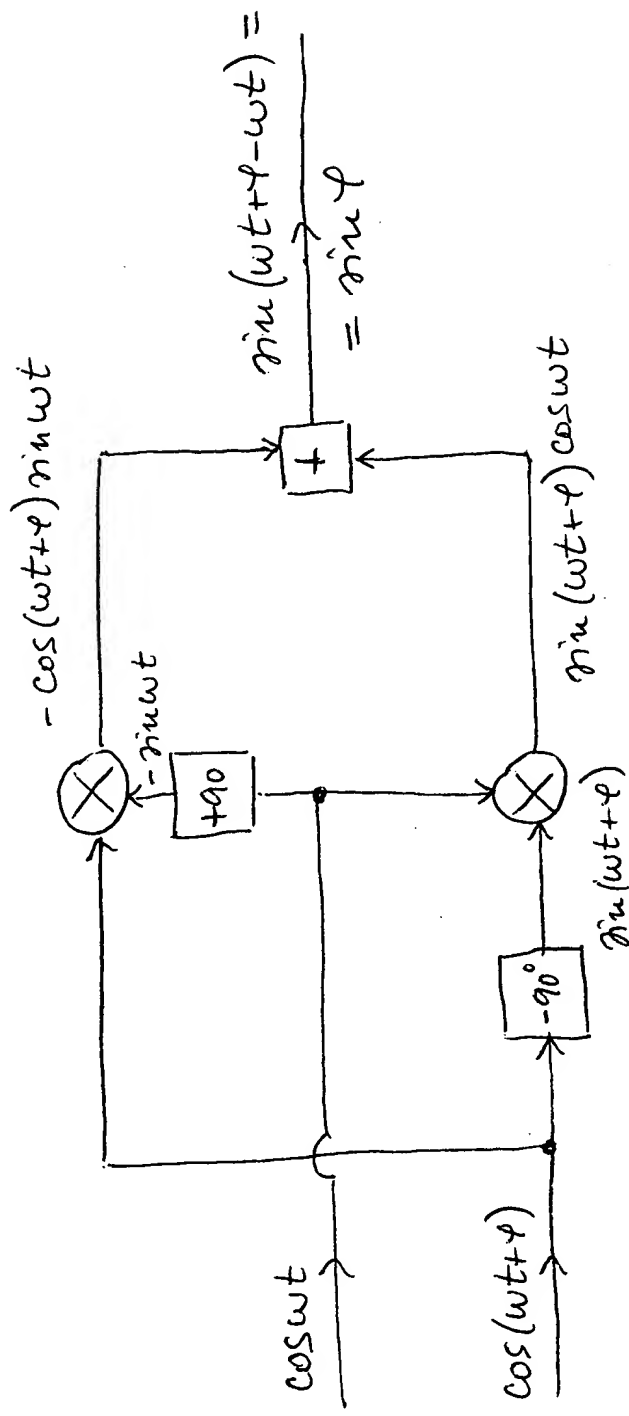


FIG. 11 PHASE DETECTOR EMPLOYING SSB MIXING

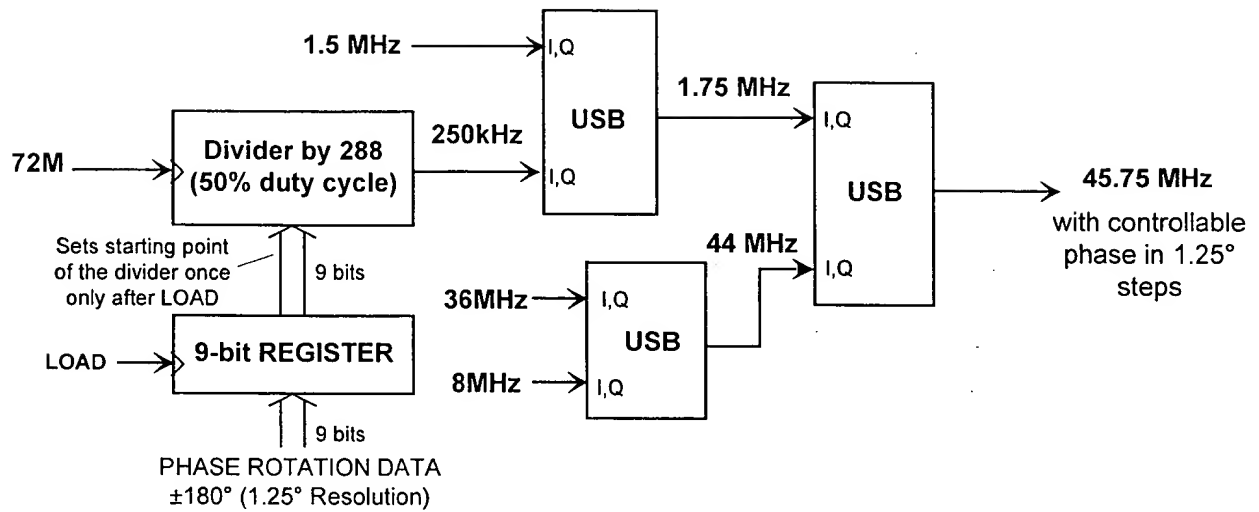


Figure 12 - Generation of 45.75MHz derived from 72 MHz, with controllable phase in $(360^\circ/288)=1.25^\circ$ steps